CLAIMS

I CLAIM:

1. An apparatus to assist in the installation of a helical pile, the apparatus comprising a drive mechanism operatively connected to a power source, said power source causing said drive mechanism to move in a first direction and then subsequently in a second direction in a reciprocating fashion, said drive mechanism having an engaged and a disengaged configuration, when in said engaged configuration said drive mechanism operatively gripping the exterior surface of said helical pile, when in said disengaged configuration said drive mechanism operatively releasing the exterior surface of said helical pile, movement of said drive mechanism in said first direction placing said drive mechanism in said engaged configuration and causing rotational movement of said helical pile, movement of said drive mechanism in said second direction placing said drive mechanism in said disengaged configuration without rotation of said helical pile.

2. The device as claimed in claim 1 including at least one pile guide, said pile guide engaging the exterior surface of said helical pile to assist in maintaining said pile at a desired inclination.

3. The device as claimed in claim 1 including a vertical loading head having an engaged position, when in said engaged position said vertical loading head

releasably secured about the exterior surface of said helical pile and permitting the application of a longitudinally oriented force to said pile while permitting rotational movement of said pile through operation of said drive mechanism.

4. The device as claimed in claim 3 wherein said vertical loading head has a disengaged position, when in said disengaged position said vertical loading head free from contact with the exterior surface of said helical pile.

5. The device as claimed in claim 1 wherein said drive mechanism includes a drive chain received about the exterior surface of said helical pile, said drive chain having a first end and a second end, said first end of said drive chain secured to a reciprocating drive member, said second end of said drive chain secured to a tensioning device.

6. The device as claimed in claim 5 wherein said reciprocating drive member is a hydraulic cylinder, a pneumatic cylinder, or an electric solenoid.

7. The device as claimed in claim 6 wherein said tensioning device comprises a spring, a pneumatic cylinder, a hydraulic cylinder or an electric solenoid.

8. The device as claimed in claim 1 including an auger, said auger operatively connected to a rotary drive mechanism such that upon rotation and insertion

of said auger into said helical pile said auger extracts at least a portion of any soil and other debris situated within said helical pile.

9. The device as claimed in claim 1 wherein said drive mechanism includes a pair of jaw members, movement of said drive mechanism in said first direction causing said jaw members to grip the exterior surface of said helical pile and causing rotational movement of said pile, movement of said drive mechanism in said second direction disengaging said jaw members from the exterior surface of said helical pile without rotation of said pile.

10. The device as claimed in claim 1 including two drive mechanisms, said power source causing said drive mechanisms to move in an opposed reciprocating fashion to permit continuous rotation of said helical pile.

11. A method of installing a helical pile, the method comprising the steps of:

(i) operatively connecting a drive mechanism having an engaged and a disengaged configuration to a power source, when in said engaged configuration said drive mechanism capable of gripping the exterior surface of the helical pile, when in said disengaged configuration the drive mechanism releasing the exterior surface of the helical pile;

(ii) with said power source operating said drive mechanism to move said drive mechanism in a first direction that places said drive mechanism in said engaged configuration such that further movement of said

drive mechanism in said first direction causes rotational movement of said pile; and,

(iii) thereafter, causing said power source to move said drive mechanism in a second direction thereby placing said drive mechanism in said disengaged configuration without rotation of said helical pile.

12. The method as claimed in claim 11 including the further steps of repeatedly operating said drive mechanism to move firstly in said first direction and secondly in said second direction to cause repeated reciprocal movement of said drive mechanism.

13. The method as claimed in claim 11 including the further step of applying a force generally parallel to the longitudinal axis of said pile while permitting rotational movement of said pile through the operation of said drive mechanism.

14. The method as claimed in claim 11 including the step of maintaining said pile at a desired inclination through the use of one or more pile guides engaging the exterior surface of said pile.

15. The method as claimed in claim 11 including the further step of inserting a rotating auger into said helical pile to extract at least a portion of any soil or debris situated therein.

16. An apparatus to assist in the installation of a helical pile, the apparatus comprising a drive mechanism having an engaged and a disengaged configuration, when in said engaged configuration said drive mechanism operatively gripping the exterior surface of said helical pile, when in said disengaged configuration said drive mechanism operatively releasing the exterior surface of said helical pile, wherein movement of said drive mechanism when in said engaged configuration causes rotational movement of said pile, when in said disengaged configuration said drive mechanism moving without rotation of said pile.

17. The device as claimed in claim 16 including at least one pile guide, said pile guide engaging the exterior surface of said helical pile to assist in maintaining said pile at a desired inclination.

18. The device as claimed in claim 16 wherein said drive mechanism includes a drive chain received about the exterior surface of said helical pile, said drive chain having a first end and a second end, said first end of said drive chain secured to a reciprocating drive member, said second end of said drive chain secured to a tensioning device.

19. The device as claimed in claim 18 wherein said reciprocating drive member causes a reciprocal movement of said drive chain and stepped rotational movement of said helical pile.

20. A method of installing a helical pile, the helical pile being of the type having a generally hollow longitudinally orientated bore extending therethrough, the method comprising the steps of:

(i) with a drive mechanism imparting rotational movement to the pile to cause the pile to be rotated into the ground; and,

(ii) extracting at least a portion of any accumulated soil or debris from within the pile's hollow bore.

21. The method as claimed in claim 20 wherein said step of extracting at least a portion of any accumulated soil or debris from within the pile's hollow bore is carried out while the pile is being rotated into the ground.

22. The method as claimed in claim 20 wherein said pile is partially rotated into the ground prior to the extraction of soil or debris from within the pile's hollow bore.

23. The method as claimed in claim 20 wherein said step of extracting at least a portion of any accumulated soil or debris from within the pile's hollow bore is carried out through inserting a rotating auger into said bore.

24. The method as claimed in claim 20 wherein said step of extracting at least a portion of any accumulated soil or debris from within the pile's hollow bore is carried out through inserting a vacuum tube into said bore.

25. An apparatus to assist in the installation of a helical pile of the type having a generally hollow longitudinally orientated bore extending therethrough, the apparatus comprising a drive mechanism and a soil extractor, said drive mechanism imparting rotational movement to the pile to cause the pile to be rotated into the ground, said soil extractor operable to extract at least a portion of any accumulated soil or debris from within the pile's hollow bore.

26. The apparatus as claimed in claim 25 wherein said soil extractor is an auger operatively connected to a rotary drive mechanism.

27. The apparatus as claimed in claim 25 wherein said soil extractor is a vacuum tube insertable into said hollow bore of said pile.

28. The apparatus as claimed in claim 27 including a water jet insertable into said hollow bore of said pile with said vacuum tube.

29. An apparatus to assist in the installation of a helical pile, the apparatus comprising a drive mechanism operatively connected to a power source, said

power source causing said drive mechanism to move in a first direction and then subsequently in a second direction in a reciprocating fashion, said drive mechanism operatively connected to the exterior surface of said helical pile such that reciprocal movement of said drive mechanism causes rotational movement of said helical pile without appreciable movement or displacement of said drive mechanism in a direction generally parallel to the longitudinal axis of said pile.

30. The device as claimed in claim 29 wherein said drive mechanism includes at least 2 actuating cylinders, said cylinders having reciprocating pistons connected to a drive gear such that alternating reciprocating movement of said pistons causes continuous rotation of said drive gear.

31. The device as claimed in claim 30 having a drive chain operatively engaging the exterior surface of said helical pile, said drive chain further engaging said drive gear such that rotation of said drive gear causes said drive chain to rotate said helical pile.

32. An apparatus to assist in the installation of a helical pile, the apparatus comprising a drive mechanism operatively connected to a power source and to the exterior surface of said helical pile, said power source causing said drive mechanism to impart rotational movement to said helical pile without appreciable movement or displacement of said drive mechanism in a

direction generally parallel to the longitudinal axis of said pile.

33. The device as claimed in claim 32 wherein said drive mechanism continuously rotates said helical pile.

34. The device as claimed in claim 32 wherein said drive mechanism includes a reciprocating drive that causes staggered rotational movement of said pile.

35. The device as claimed in claim 32 wherein said drive mechanism includes a drive chain received about the exterior surface of said pile, movement of said drive chain imparting rotational movement to said pile.